

A NEW SPECIES OF *EPIMICTA* FÖRSTER (HYMENOPTERA:
BRACONIDAE) FROM NORTH AMERICA AND NEW DISTRIBUTION
RECORDS FOR *EPIMICTA GRIFFITHSI* WHARTON

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Abstract.—*Epimicta konzaensis* Kula, new species, from Kansas and Tennessee is described. A diagnosis and key are provided for differentiation of the three species currently included in *Epimicta* Förster. New distribution records for *Epimicta griffithsi* Wharton are reported from Kansas, Wyoming, and British Columbia.

Key Words: Alysiinae, Dacnusiini, Nearctic, parasitoids

Epimicta Förster is an uncommon genus in Dacnusiini with two described species worldwide. *Epimicta griffithsi* Wharton is the only described species from the New World and is known from Texas (Wharton 1994). *Epimicta marginalis* (Haliday) is currently the only described species from the Old World and is known from western Europe (Shenefelt 1974, Tobias 1986). Another Palaearctic species, *Synelix rossica* (Telenga), was originally placed in *Epimicta* but was transferred to *Synelix* Förster by Tobias (1986).

Relative to species in larger dacnusiine genera (e.g., *Chorebus* Haliday), species in *Epimicta* are infrequently collected. For example, determinations (by RRK) for 1,678 dacnusiine specimens in the Canadian National Collection of Insects (CNCI) resulted in 633 specimens of *Chorebus* and only five specimens of *Epimicta*. Thus, the paucity of described species in *Epimicta* appears to be a reflection of taxon rarity, not a result of limited collecting effort.

It is likely that most transient collecting efforts fail to acquire species in *Epimicta*. A species in *Epimicta* may be present at a particular locality but will remain undetect-

ed if the collecting effort does not coincide with the species' phenology. Long-term collecting programs are an effective strategy for collecting rare taxa (e.g., *Epimicta*) because they circumvent the problem of phenology. For example, Whitfield and Lewis (2001) sampled the braconid fauna of six tallgrass prairies in the midwestern United States. Konza Prairie Biological Station (KPBS), a 3,487 hectare tallgrass prairie located in the Flint Hills near Manhattan, Kansas, was among the prairies sampled. For one week each month in June, July, and August, two Malaise traps were placed in KPBS watershed 4B (54.5 hectares). In that short period of time and small sampling area, 293 braconids representing 20 subfamilies and 86 species were collected. KPBS had the greatest species richness among the prairies sampled, but species in *Epimicta* were not recovered.

The second author (GZ) initiated a long-term collecting program at KPBS in April 2001. At least five watershed units were continuously sampled annually, spring through fall, using Malaise traps and yellow pan traps. Additionally, sweep net samples were periodically taken throughout the col-

lecting season. During the first two collecting seasons, several specimens of *Epimicta* were acquired. In this paper one new species in *Epimicta* is described, and the known distribution of *E. griffithsi* is expanded.

MATERIALS AND METHODS

Most specimens used in this study were collected with Malaise traps and a sweep net at KPBS. The Kansas State University Museum of Entomological Prairie Arthropod Research (KSU-MEPAR), the University of Wyoming Insect Museum (UWIM), and the CNCI provided additional specimens. All specimens were compared with paratypes of *E. griffithsi* housed at Texas A&M University (TAMU). Wharton (1994) indicated the holotype for *E. griffithsi* was deposited in the National Museum of Natural History (NMNH), but it is currently missing and could not be examined. Diagnostic information in Tobias (1986) and Wharton (1994) was used to differentiate *Epimicta konzaensis* Kula, new species, and *E. griffithsi* from *E. marginalis*.

Measurements are as in Wharton (1977) with the following additions and modifications. Tergite 1 (t1) length is the maximum length of t1 in lateral view, and t1 width is the width of the posterior edge of t1 in dorsal view. Thorax length and thorax height are referred to as mesosoma length and mesosoma height, respectively. Mesonotal width is referred to as mesoscutal width. The following abbreviations are used for measurements in the description: head length (HL), head width (HW), temple width (TW), face width (FW), face height (FH), eye length (EL), eye height (EH), mandible length (MNL), mandible apical width (MNAW), mandible basal width (MNBW), flagellomere 1 length (F1L), flagellomere 2 length (F2L), mesosoma length (ML), mesoscutum width (MW), mesosoma height (MH), t1 length (T1L), and t1 width (T1W). Measurements were taken using an ocular micrometer in a Leica MZ APO stereomicroscope with 10× oculars.

Mandibular setation and the shape of each tooth are described as observed in lateral view. The numbering of teeth follows Wharton (1977). Terminology for anatomical features, surface sculpture, and setation follows Sharkey and Wharton (1997).

Data used in the description were taken from the holotype, four paratype females, and the paratype male. Two additional females were examined but not used for the description because of their poor condition.

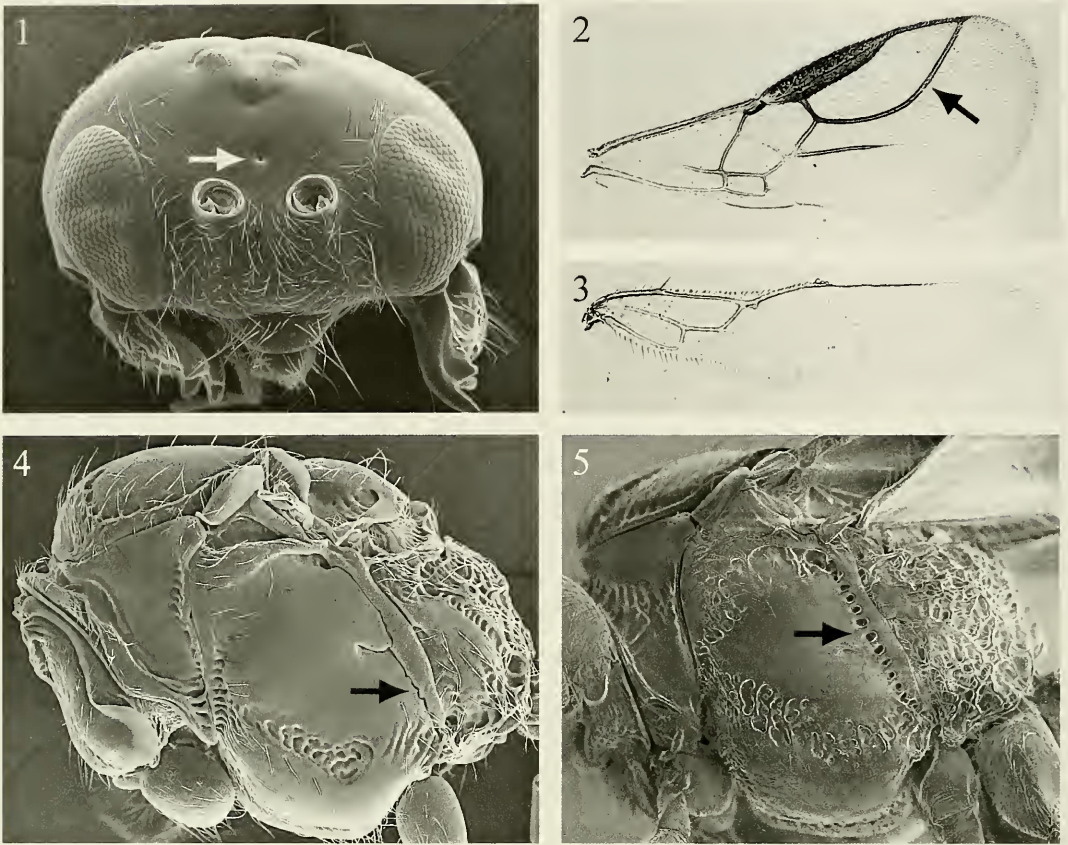
RESULTS AND DISCUSSION

Epimicta konzaensis Kula, new species (Figs. 1–4)

Diagnosis.—Several characters can be used to differentiate *E. konzaensis* from *E. griffithsi*. In *konzaensis* the head is yellow except very dark brown surrounding the ocelli, the mandibles are whitish yellow, the frons is smooth, and the 3RS vein in the forewing is evenly curved. In *griffithsi* the head is entirely black, the mandibles are dark yellow to yellow brown, the frons is usually (90% of type specimens) rugose, and the 3RS vein in the forewing is weakly sinuate.

The characters Wharton (1994) used to differentiate *griffithsi* from *E. marginalis* can also be used to differentiate *konzaensis* from *marginalis*. The most distinct diagnostic difference between *konzaensis* and *marginalis* is the location of crenulations within the posterior mesopleural furrow. In *konzaensis* the posterior mesopleural furrow is smooth dorsal to the episternal scrobe and minutely crenulate ventrally. In *marginalis* the entire posterior mesopleural furrow is conspicuously crenulate (Fig. 5). Additionally, in *konzaensis* the head is yellow except very dark brown surrounding the ocelli, and in *marginalis* the head is entirely black.

Description.—Female. *Body length*: 2.06–2.34 mm. *Head*: HL 0.58–0.59× HW, HW 0.94–1.00× TW, FW 1.78–1.89× FH, EL 0.50–0.58× EH, MNL 1.00–1.13×



Figs. 1–5. 1–4. *Epimicta konzaensis*. 1, Frons with pit mesally. 2, Forewing with vein 3RS evenly curved. 3, Hind wing. 4, Mesopleuron with posterior mesopleural furrow crenulate ventral to episternal scrobe. 5, Mesopleuron of *E. marginalis* with posterior mesopleural furrow entirely crenulate.

MNAW, MNAW $1.29\text{--}1.38\times$ MNBW, FIL $1.00\text{--}1.25\times$ F2L; antenna with 21–22 flagellomeres, maxillary palp 6 segmented, labial palp 4 segmented; face smooth, setiferous; frons smooth, occasionally (50% of type specimens) with pit mesally, setiferous laterally, glabrous mesally; gena and vertex smooth, setiferous; occiput smooth, glabrous; eyes glabrous; clypeus with apical rim, setiferous; mandible with 4 teeth (as for *E. griffithsi* in Wharton 1994), excavated distal portion glabrous, rest of mandible setiferous, tooth 1 round, with diagonal ridge, tooth 2 nearly an equilateral triangle, tooth 3 round, tooth 4 (additional tooth) located along ventral margin. *Mesosoma*: ML $1.64\text{--}1.81\times$ MW, ML $1.30\text{--}1.41\times$ MH, MW $0.78\text{--}0.86\times$ MH; lateral portion

of pronotum smooth to slightly rugose, setiferous along margins, glabrous mesally, latero-anterior furrow smooth, latero-posterior margin almost entirely unsculptured (a few crenulae ventrally), entirely crenulate, or with transverse ridges radiating anteriorly; notauli crenulate, continuous with lateral margin of mesoscutum, terminating antierad mesoscutal midpit; mesoscutal midpit slitlike, crenulate; mesoscutum (excluding lateral margin, notauli, and midpit) smooth, setiferous laterally, anteriorly, and along lines where notauli would run if complete; dorsal surface of scutellum smooth, setiferous, scutellar sulcus with 4–8 longitudinal ridges; metanotum with sharp dorsal protuberance; propodeum areolate rugose, setiferous; sternaulus rugose; posterior me-

sopleural furrow smooth dorsal to episternal scrobe, minutely crenulate ventrally; mesopleuron (excluding sternaulus and posterior mesopleural furrow) dorso-ventrally crenulate along anterior margin, anterior portion of subalar region rugose, smooth mesally, setiferous along anterior and ventral margins; metapleuron with smooth mesal portion surrounded by rugosities, setiferous. *Forewing*: Hyaline; stigma with well-defined proximal and distal margins; vein r basad middle of stigma; vein 1m-cu basad vein 2RS; vein 3RS evenly curved to leading margin; 1st subdiscal cell closed by tubular veins. *Hind wing*: Hyaline; basal and subbasal cells closed by tubular veins. *Metasoma*: T1L 1.07–1.27× T1W; t1 longitudinally rugose, setiferous, dorsope present; t2 striate, setiferous; t3 entirely smooth or mostly smooth with anterior edge striate, setiferous mesally or in posterior half of tergite; t4–t6 smooth, setiferous mesally or in posterior half of tergite; remaining tergites smooth, setiferous; ovipositor partially exerted, slightly visible dorsally. *Color*: Head yellow except very dark brown surrounding ocelli, mouthparts whitish yellow except distal margin of mandible amber with tooth 2 conspicuously darker than other teeth, antennal flagellomeres brown with proximal flagellomeres lighter than distal flagellomeres, scape and pedicel brownish yellow to yellow; mesosoma very dark brown except propleuron brownish yellow to brown; t1 very dark brown, t2 orangish brown, t3 yellowish brown to brownish yellow with posterior edge brown, remaining tergites brown; prothoracic and mesothoracic legs yellow with tarsi darker than other leg parts, metathoracic leg yellow except distal half of tibia and entire tarsus brown to dark brown.

Male. As in female except: *Head*: HL 0.63× HW, FW 1.67× FH, EL 0.69× EH; antenna with 23 flagellomeres. *Mesosoma*: ML 1.46× MH. *Color*: t2 whitish yellow, metathoracic leg yellow with distal half of tibia and entire tarsus darker than other leg parts.

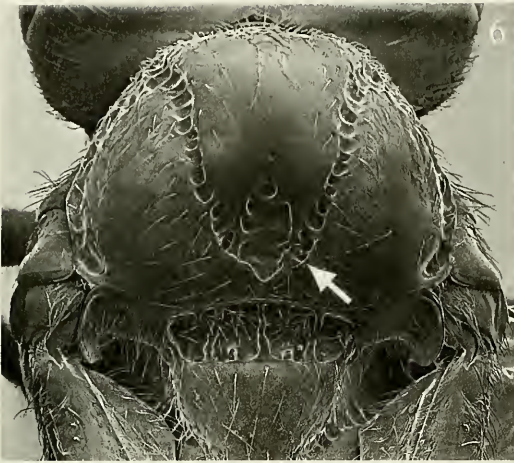
Host.—Unknown.

Material examined.—Holotype female: Top label = USA, “KANSAS: Riley Co.; Konza Prairie Biol. Station; Kings Creek”. Second label = “39°06.20'N, 96°35.77'W; 27.iv.-1.v.2001; Zolnerowich, Kula, Brown: Malaise trap” (NMNH). Paratypes: 1 ♀ same data as holotype; 1 ♀ same data as holotype except 26.iv.-30.iv.2002, 2002-010; 1 female same data as holotype except 13.v.-16.v.2002, 2002-030; 1 ♂ same data as holotype except 23.iv.-26.iv.2002, yellow pan traps 2002-005; 1 ♀ same data as holotype except 11.v.2002 R. R. Kula, sweep net (KSU-MEPAR). *Other determined material*: 1 ♀ same data as holotype except 4.v.-9.v.2002, 2002-020 (KSU-MEPAR); 1 ♀ USA, TENNESSEE: Hamilton Co., East Ridge, 9.v.1952, G. S. Walley (CNCI).

Discussion.—*Epimicta konzaensis* and *E. griffithsi* are morphologically similar to certain species in *Dacnusa* Haliday and *Exotela* Förster. However, the additional tooth along the ventral margin of the mandible and striate t2 clearly place both species in *Epimicta*. *Epimicta marginalis* is larger and more heavily sculptured than *konzaensis* and *griffithsi* and in habitus more closely resembles certain species in *Symphya* Förster. *Epimicta* and *Symphya* contain all dacnines with a striate t2 and an additional tooth along the ventral margin of the mandible. However, in *Symphya* t2+t3 is carapacelike, while in *Epimicta* t2+t3 is not carapacelike. The relationship between *Epimicta* and *Symphya* is discussed in Griffiths (1964) and Wharton (1994).

All specimens from KPBS were collected in a gallery forest along an intermittent stream. The dominant tree species in the forest are *Quercus macrocarpa* Michx. (bur oak), *Quercus muehlenbergii* Engelm. (chinquapin oak), *Celtis occidentalis* L. (hackberry), and *Ulmus americana* L. (American elm) (Knight et al. 1994). Host utilization is unknown for all species in *Epimicta*.

Etymology.—This species is named after



Figs. 6-7. Notauli. 1, *Epimicta marginalis* (complete). 2, *E. griffithsi* (incomplete).

the collection site, Konza Prairie Biological Station.

Epimicta griffithsi Wharton

Epimicta griffithsi Wharton 1994: 630

Distribution.—New distribution records are indicated by asterisks. *CANADA, BRITISH COLUMBIA: 1 female Vaseux Lake, Oliver, 13.v.1959; 1 female Oliver, 24.v.1959 (CNCI). USA, *KANSAS: Riley Co. 1 female Manhattan, 25.iv.1938; 1 male KPBS, Kings Creek, 39°06.20'N 96°35.77'W, 25.iv.-27.iv.2001; 1 female 2 males KPBS, Kings Creek, 39°06.20'N 96°35.77'W, 4.v.-9.v.2001; 2 males KPBS, Kings Creek, 39°06.20'N 96°35.77'W, 11.v.-15.v.2001; 1 male KPBS, Kings Creek, 39°06.20'N 96°35.77'N, 30.iv.-4.v.2002; 1 male KPBS, watershed 4B, 39°04.65'N 96°35.75'W, 4.v.-9.v.2001; 1 female KPBS, watershed 4F, 39°04.37'N 96°34.26'W, 11.v.-15.v.2001; 1 female KPBS, watershed SpB, 39°04.50'N 96°35.25'W, 1.vi.-8.vi.2001 (KSU-ME-PAR); TEXAS: Bosque Co. 7 females 1 male 3 mi. W. Laguna Park, 13.iv.1984 (CNCI, TAMU, NMNH); Brazos Co. 1 male College Station, 13.iii.-18.iii.1982; 1 male College Station, 8.iii.-31.iii.1991 (TAMU); *Kerr Co. 1 male Kerrville, 30.iii.1959 (CNCI); *WYOMING: 3 fe-

males 2 males Grand Teton National Park, University of Wyoming-National Park Service Research Center, 1.viii.-9.viii.2002; 1 female Grand Teton National Park, University of Wyoming-National Park Service Research Center, 25.vii.1990 (UWIM).

KEY TO SPECIES IN *EPIMICTA*

- 1. Posterior mesopleural furrow entirely crenulate; notauli complete, extending to posterior margin of mesoscutum (Fig. 6) (Palearctic) *E. marginalis* (Haliday)
- Posterior mesopleural furrow smooth, at most with a few crenulae ventral to episternal scribe; notauli incomplete, terminating anterior mesoscutal midpit (Fig. 7) (Nearctic) 2
- 2. Head entirely black; mandibles dark yellow to yellow brown; frons usually rugose; forewing 3RS vein weakly sinuate . . . *E. griffithsi* Wharton
- Head yellow except very dark brown surrounding ocelli; mandibles whitish yellow; frons smooth; forewing 3RS vein evenly curved *E. konzaensis* Kula, new species

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LITERATURE CITED

- Griffiths, G. C. D. 1964. The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera). I. General questions of taxonomy, biology and evolution. *Beiträge zur Entomologie* 14: 823–914.
- Knight, C. L., J. M. Briggs, and M. D. Nellis. 1994. Expansion of gallery forest on Konza Prairie Research Natural Area, Kansas, USA. *Landscape Ecology* 9: 117–125.
- Sharkey, M. J. and R. A. Wharton. 1997. Morphology and terminology, pp. 19–37. *In* Wharton, R. A., P. M. Marsh, and M. J. Sharkey, eds. *Manual of the New World Genera of the Family Braconidae* (Hymenoptera). International Society of Hymenopterists. Special Publication 1, 439 pp.
- Shenefelt, R. D. 1974. Pars 11. Braconidae 7. Alysiinae, pp. 937–1113. *In* Vecht, J. van der and R. D. Shenefelt, eds. *Hymenopterorum Catalogus* (nova editio). Dr. W. Junk, The Hague.
- Tobias, V. I. 1986. Subfamily Alysiinae, pp. 100–231. *In* Medvedev, G. S., ed. *Keys to the Insects of the European Part of the USSR*, Vol. III, Hymenoptera, Part V. Akademia Nauk, Leningrad, 501 pp. [in Russian, English translation published in 1995].
- Wharton, R. A. 1977. New World *Aphaereta* species (Hymenoptera: Braconidae: Alysiinae), with a discussion of terminology used in the tribe Alysiini. *Annals of the Entomological Society of America* 70: 782–803.
- . 1994. New genera, species, and records of New World Alysiinae (Hymenoptera: Braconidae). *Proceedings of the Entomological Society of Washington* 96: 630–664.
- Whitfield, J. B. and C. N. Lewis. 2001. Analytical survey of the braconid wasp fauna (Hymenoptera: Braconidae) on six Midwestern U.S. tallgrass prairies. *Annals of the Entomological Society of America* 94: 230–238.